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PTO/SB/21 (6-98)

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	•	Application Number	09/812,605
OTRANSMITT	AL	Filing Date	March 20, 2001
MAR 2 6 2004 N FORM		First Named Inventor	Richard E. Pearl
(to be used for all correspondence after in	nitial filing)	Group Art Unit	1751
RADEMAER	.	Examiner Name	Gregory E. Webb
Total Number of Pages in This Submission	44	Attorney Docket Number	27200/04005

		ENCLOSURES (check all that app	oly)	
Fee Transmittal Fo	laration(s) Request nent Request sure Statement Priority ng Parts/	Assignment Papers (for an Application) Formal Drawing(s) Licensing-related Papers Petition Routing Slip (PTO/SB/69) and Accompanying Petition Petition to Convert to a Provisional Application Power of Attorney, Revocation Change of Correspondence Address Terminal Disclaimer Small Entity Statement Request for Refund		□ After Allowance Communication to Group □ Appeal Communication to Board of Appeals and Interferences □ Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) □ Proprietary Information □ Status Letter ☑ Additional Enclosure(s) (please identify below) □ Letter enc. prev. filed Amendments □ Return receipt postcard
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Firm Or Individual name Signature Date	Calfee, Halter 8	Well.		Customer No. 24024
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Typed or printed name	Debra L. Hale			
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Debro I Hole

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re D	Divisional Application of: Richard E. Pearl)		
Serial	No.: 09/812,605)	Art Unit:	1751
Filed:	March 20, 2001)	Examiner:	Gregory E. Webb
For:	IMPROVED LATEX PAINT REMOVER)	Attorney Doo	eket No. 27200/04005
	onal of SN 09/603,059 June 26, 2000)	Customer No	o. 24024
P.O. B	nissioner for Patents ox 1450 ndria, VA 22313-1450			

LETTER

Dear Sir:

In response to a request made by the Examiner by telephone on or about February 27, 2004, Applicant provides herewith a copy of the response filed on October 3, 2003, including a copy of the accompanying return receipt postcard.

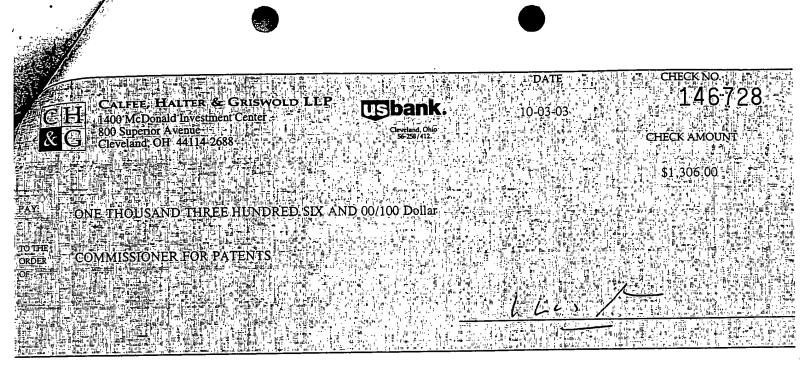
Upon checking, we have learned that we have not received the return receipt postcard stamped by the PTO.

Also enclosed is a copy of a Supplemental Amendment filed on October 7, 2003.

Respectfully submitted,

John E. Miller, Reg. No. 26,206

(216)622-8679



#146728# #0412025B2#

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Deposited with the United States Postal Service via First Class Mail and addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 this 3rd day of October, 2003.

In re Divisional Application of Richard E. Pearl Serial No.: 09/812,605; filed March 20, 2001 For: LATEX PAINT REMOVER

Our Ref: 27200/04005

Please acknowledge receipt of:

- Transmittal (1 pg.); Fee Transmittal (1 pg.);
- Request for Extension of Time (1 pg.);
- Amendment (10 pgs.) w/ attachment (12 pgs.)
- Check in the amount of \$1,306.00
- Return receipt postcard

JEM/dlh

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

REMOVER) Customer No. 24024	
For: IMPROVED LATEX PAINT REMOVER) Attorney Docket No. 27200/040)05
Filed: March 20, 2001) Examiner: Gregory Webb	
Serial No.: 09/812,605) Art Unit: 1751	
n re Divisional Application of: Richard E. Pearl)	

Commissioner of Patents P.O. Box 1450 Alexandria, VA 22313-1450

AMENDMENT

Dear Sir:

In response to the Office Action of April 8, 2003, please amend the above-identified application as follows:

Amendments to the claims begin on page 2 of this paper.

Remarks begin on page 7.

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Debra L. Hale

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Divisional Application of: Richard E. Pea	rl)
Serial No.: 09/812,605) Art Unit: 1751
Filed: March 20, 2001) Examiner: Gregory E. Webb
For: IMPROVED LATEX PAINT REMOVER) Attorney Docket No. 27200/04005) Customer No. 24024
Division of SN 09/603,059 Filed June 26, 2000)))
Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450	

SUPPLEMENT TO AMENDMENT

Dear Sir:

Supplemental to the Amendment filed on October 3, 2003, applicant provides for the Examiner's convenience updated MSDS's for n-methylpyrrolidone and γ -butyrolactone. As can be seen from these documents, both of these solvents are recognized as being eye irritants.

Respectfully submitted,

John E. Miller, Reg. No. 26,206

(216)622 8679

Amendments to the Claims

A complete set of the claims now in the case is set forth below. These claims replace all prior versions of the claims.

- 1. (Currently Amended) A process for removing an organic contaminant from a surface comprising contacting the contaminant with a cleaning composition [comprising] which is essentially free of alkali metal hydroxides, which is not classified as an eye irritant under 16 CFR 1500.42 and which consists essentially of at least 50 wt.% of at least one cleaning member selected from the group consisting of
 - (a) organic esters having 6 to 10 carbon atoms other than isobutyl isobutyrate,
 - (b) mixtures containing at least three esters selected from hexyl, heptyl, octyl, nonyl, and decyl acetates,
 - (c) propylene carbonate, and
 - (d) naturally-occurring esters having flash points of greater than 60°F and boiling points greater than 120°F.

[wherein the cleaning composition is essentially free of alkali metal hydroxides] and thereafter causing the contaminant to be removed from the surface by at least one of

- (i) the flow of the cleaning composition itself,
- (ii) the evaporation of the cleaning composition itself,
- (iii) wiping the surface, and
- (iv) washing the surface with a composition consisting of a liquid.
- 2. (Previously Amended) The process of claim 1, wherein a contaminant selected from the group consisting of dried latex paint, uncured organic solvent based paint, adhesives, ink, chewing gum, tars, greases, glues, animal fats, vegetable oils, tree sap and other lipophilic soil is removed by contact with the cleaning composition.
- 3. (Previously Amended) The process of claim 2, wherein the contaminant is dried latex paint.
- 4. (Amended) The process of claim 2, wherein the cleaning composition comprises at least [10] 80 wt.% cleaning member.
- 5. (Previously Amended) The process of claim 4, wherein the composition contains at least 10 wt.% of a liquid carrier other than the cleaning member.

- 6. (Previously Amended) The process of claim 5, wherein the cleaning member is dissolved in an organic solvent exhibiting a Primary Irritation Score of 5.00 or less under 16 CFR 1500.3(c)(4).
- 7. (Previously Amended) The process of claim 6, wherein the liquid carrier has an MIR of 2.0 or less.
- 8. (Previously Amended) The process of claim 6, wherein the composition has a flash point of at least about 100°F.
- 9. (Previously Amended) The process of claim 8, wherein the composition exhibits a Primary Irritation Score of 5.00 or less under 16 CFR 1500.3(c)(4).
- 10. (Previously Amended) The process of claim 5, wherein the composition has an MIR of 2.0 or less.
- 11. (Previously Amended) The process of claim 10, wherein the composition is substantially free of aromatic compounds and alkali metal hydroxides.
- 12. (Previously Amended) The process of claim 1, wherein the composition contains water.

13-20. (Previously Cancelled)

- 21. (Amended) The process of claim [1] 2, wherein the cleaning member is an organic ester having 6 to 10 carbon atoms other than isobutyl isobutyrate.
- 22. (Previously Added) The process of claim 1, wherein a contaminant selected from the group consisting of dried latex paint, uncured organic solvent based paint, adhesives, ink, chewing gum, tars, greases, glues, animal fats, vegetable oils, tree sap and other lipophilic soil is removed by contact with a cleaning composition containing at least 10 wt.% of a cleaning member selected from organic esters having 6 to 10 carbon atoms other than isobutyl isobutyrate, the cleaning composition
 - having a flash point of at least about 100°F,
 - exhibiting a Primary Irritation Score of 5.00 or less under 16 CFR 1500.3(c)(4), and
 - having an MIR of 2.0 or less.
- 23. (Previously Added) The process of claim 22, wherein the cleaning composition contains at least 50 wt.% of the organic ester.
- 24. (Previously Added) The process of claim 23, wherein the cleaning composition contains at least 80 wt.% of the organic ester.

- 25. (Previously Added) The process of claim 24, wherein the cleaning composition contains at least 90 wt.% of the organic ester.
- 26. (New) The process of claim 1, wherein the contaminant is removed from the surface by washing the surface with soapy water or an organic solvent.
- 27. (New) The process of claim 1, wherein the cleaning composition consists of at least 80 wt.% of the cleaning member and at least one additional ingredient selected from the group consisting of colorants, antioxidants, fragrances emollients, thickeners, defoamers, surfactants and liquid carriers.
 - 28. (New) The process of claim 27, wherein the cleaning composition
 - has a flash point of at least about 100°F,
 - exhibits a Primary Irritation Score of 5.00 or less under 16 CFR 1500.3(c)(4), and
 - has an MIR of 2.0 or less.
- One organic contaminant comprising dried latex paint, uncured organic solvent based paint, adhesives, ink, chewing gum, tars, greases, glues, animal fats, vegetable oils, tree sap or other lipophilic soil, the process comprising contacting the contaminant with a cleaning composition which is essentially free of alkali metal hydroxides, has a flash point of at least about 100°F, which exhibits a Primary Irritation Score of 5.00 or less under 16 CFR 1500.3(c)(4), which has an MIR of 2.0 or less and which is not classified as an eye irritant under 16 CFR 1500.42, the composition consisting essentially of at least 80 wt.% of at least one cleaning member selected from the group consisting of
 - (a) organic esters having 6 to 10 carbon atoms other than isobutyl isobutyrate,
 - (b) mixtures containing at least three esters selected from hexyl, heptyl, octyl, nonyl, and decyl acetates,
 - (c) propylene carbonate, and
 - (d) naturally-occurring esters having flash points of greater than 60°F and boiling points greater than 120°F,

and thereafter causing the contaminant to be removed from the surface by at least one of

- (i) the flow of the cleaning composition itself,
- (ii) the evaporation of the cleaning composition itself,
- (iii) wiping the surface, and

- (iv) washing the surface with a composition consisting of a liquid.
- 30. (New) The process of claim 29, wherein the contaminant is dried latex paint.
- 31. (New) The process of claim 29, wherein the cleaning composition optionally contains a liquid carrier, the liquid carrier having an MIR of 2.0 or less.
 - 32. (New) The process of claim 31, wherein the liquid carrier
 - is non-toxic according to 16 CFR 1500.3(c)(2)(i),
 - exhibits a Primary Irritation Score of 5.00 or less under, and
 - is not an eye irritant under 16 CFR 1500.42.
- 33. (New) A process for removing dried latex paint from a surface, the process comprising contacting the dried latex paint with a cleaning composition which is essentially free of alkali metal hydroxides, has a flash point of at least about 100°F, which exhibits a Primary Irritation Score of 5.00 or less under 16 CFR 1500.3(c)(4), which has an MIR of 2.0 or less and which is not classified as an eye irritant under 16 CFR 1500.42, the composition consisting essentially of at least 50 wt.% of at least one cleaning member selected from the group consisting of organic esters having 7 to 9 carbon atoms other than isobutyl isobutyrate, and thereafter causing the contaminant to be removed from the surface by at least one of
 - (i) the flow of the cleaning composition itself,
 - (ii) the evaporation of the cleaning composition itself,
 - (iii) wiping the surface, and
 - (iv) washing the surface with a composition consisting of a liquid.
 - 34. (New) The process of claim 33, wherein the organic ester has 7 carbon atoms.
 - 35. (New) The process of claim 33, wherein the organic ester has 8 carbon atoms.
 - 36. (New) The process of claim 33, wherein the organic ester has 9 carbon atoms.
- 37. (New) The process of claim 33, wherein the composition consists essentially of at least 80 wt.% of the cleaning member.
 - 38. (New) The process of claim 37, wherein the organic ester has 7 carbon atoms.
 - 39. (New) The process of claim 37, wherein the organic ester has 8 carbon atoms.
 - 40. (New) The process of claim 37, wherein the organic ester has 9 carbon atoms.
 - 41. (New) The process of claim 37, wherein the ester is a heptanoate.
 - 42. (New) The process of claim 37, wherein the ester is a propionate.

(New) A process for removing dried latex paint from a surface, the process comprising contacting the dried latex paint with a cleaning composition which is essentially free of alkali metal hydroxides, has a flash point of at least about 100°F, which exhibits a Primary Irritation Score of 5.00 or less under 16 CFR 1500.3(c)(4), which has an MIR of 2.0 or less and which is not classified as an eye irritant under 16 CFR 1500.42, the composition consisting essentially of at least 50 wt.% of at least one cleaning member selected from the group consisting of organic esters having 7 to 9 carbon atoms other than isobutyl isobutyrate.

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Debra L. Hale

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re D	ivision	al Application of: Richard E. Pearl)		
Serial :	No.:	09/812,605)	Art Unit:	1751
Filed:	March	20, 2001)	Examiner:	Gregory Webb
For:		OVED LATEX PAINT)	Attorney Doc	ket No. 27200/04005
	REMO	OVER)	Customer No.	24024

Commissioner of Patents P.O. Box 1450 Alexandria, VA 22313-1450

REQUEST FOR EXTENSION OF TIME

Dear Sir:

Pursuant to 37 C.F.R. §1.136(a), applicants hereby petition for a three-month extension of the statutory period for response to the Office Action dated April 8, 2003. Enclosed is a check including \$950.00 to cover the large entity three-month extension of time to respond.

If any additional fees are due with this request, please charge our Deposit Account No. 03-0172.

Respectfully submitted,

John E Miller, Reg. No. 26,206

(216)622-8679

rough 09/30/2000. OMB 0651-0031 Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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Approved for u.

		Application Number	09/812,605
TRANSMITT	AL	Filing Date	March 20, 2001
FORM		First Named Inventor	Richard E. Pearl
(to be used for all correspondence after in	offial filing)	Group Art Unit	1751
(to be used for all correspondence after in	iba iiiig)	Examiner Name	Gregory E. Webb
Total Number of Pages in This Submission	25	Attorney Docket Number	27200/04005

ENCLOSURES (check all that apply)

Fee Transmittal Form Fee Attached Amendment / Response After Final Affidavits/declaration(s) Extension of Time Request Express Abandonment Request Information Disclosure Statement Certified Copy of Priority Document(s) Response to Missing Parts/ Incomplete Application Response to Missing Parts	Assignment Papers (for an Application) Formal Drawing(s) Licensing-related Papers Petition Routing Slip (PTO/SB/69) and Accompanying Petition Petition to Convert to a Provisional Application Power of Attorney, Revocation Change of Correspondence Address Terminal Disclaimer Small Entity Statement Request for Refund	After Allowance Communication to Group Appeal Communication to Board of Appeals and Interferences Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) Proprietary Information Status Letter Additional Enclosure(s) (please identify below) - Check for \$1,306.00 - Return receipt postcard
under 37 CFR 1.52 or 1.53		
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Signature Allu-		Customer No. 24024
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FEE TRANSMITTAL for FY 2003

Patent fees are subject to annual revision

TOTAL AMOUNT OF PAYMENT

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Application Number	09/812,605	
Filing Date	March 20, 2001	
First Named Inventor	Richard E. Pearl	
Examiner Name	Gregory E. Webb	
Group Art Unit	1751	
Attorney Docket No.	27200/04005	J

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SUBMITTED BY			Complete (if a	applicable)
Name (Print/Type)	John H. Miller A.	Registration No. (Attorney/Agent) 26,206	Telephone	(216) 622-8679
Signature	16 19 11/11		Date	October 3, 2003
2 Signature				

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REMARKS

The foregoing amendments are made to more thoroughly define the subject matter Applicant regards as his invention. Support for the limitations added to claim 1 regarding the fact that the cleaning composition is not an eye irritant and the subsequent removal of the contaminant can be found in the specification at page 8, lines 8 and 15-19. Support for the limitations in new claims 33-43 regarding the particular esters recited in these claims can be found in the specification at page 4, lines 1-2.

Applicant respectfully traverses the various prior art rejections insofar as they apply to the claims as amended. An important feature of the present invention is that the cleaning compositions used in the inventive process are strong enough to remove most contaminants commonly found in the home environment, including dried latex paint as well as uncured organic solvent based paints, while at the same time being substantially benign (or at least not particularly detrimental) from an environmental and health standpoint. Although the cited references show many organic chemicals being used in many different industrial processes, they do not show or suggest processes in which common household organic contaminants are easily removed with essentially benign organic solvents.

Thus, the Roelofs patent does indeed show removing paint from paint fluid delivery system using cleaning compositions which may include a wide variety of different organic solvents, including some of the organic solvents used in the cleaning compositions of the present invention. However, an essential feature of the Roelof's cleaning compositions is that they also contain abrasive particles. Col. 3, line 15 and col. 5, line 12. Therefore, this patent does not disclose or suggest a process in which a cleaning composition which is **not classified as an eye irritant** under 16 CFR 1500.42 and which **consists essentially of** the indicated cleaning members, as now recited in claim 1, is used to remove an organic contaminant from a surface.¹

As stated by the Federal Circuit in <u>AK Steel Corporation v. Sollac et al.</u>, (No. 03-1074,-1075,-1085,-1086)(Fed. Cir. 9/23/03) (citing <u>PPG Indus. v. Guardian Indus. Corp.</u>, 156 F.3d 1351, 1354 (Fed. Cir. 1998) and <u>In re Janakirama-Rao</u>, 317 F.2d 951, 954 (CCPA 1963)) "consisting essentially of" in a patent claim permits inclusion of components not listed in the

¹ Applicant has not specifically tested the Roelofs compositions according to the eye irritant test of 16 CFR 1500.42, but presumes they would not pass this test because of they contain significant amounts of abrasive particles.

claim, provided that they do not "materially affect the basic and novel properties of the invention."

In this case, Roelof's abrasive particles would clearly cause eye irritation and hence would exert a material adverse effect on the cleaning compositions of the present invention. Thus, these ingredients are excluded from the scope of Applicant's claims. That being the case, the Roelofs Patent does not disclose or suggest the subject matter of these claims, since cleaning with abrasive particles is a critical feature of the Roelofs technology.

In this connection, Applicant notes that the "organic solvents, surfactants, acids, and alkali materials that are suitable for the [patented] abrasive cleaner compositions" can also be used to pretreat the fluid handling systems being cleaned in the Roelofs patent. See, col. 7, lines 36-38. However, such pretreating must be followed by treatment with the patented cleaning compositions, which necessarily contain abrasive particles, as indicated above. Accordingly, this patent does not disclose or suggest a cleaning process in which the contaminant is removed by

- (i) the flow of the cleaning composition itself,
- (ii) the evaporation of the cleaning composition itself,
- (iii) wiping the surface, and/or
- (iv) washing the surface with a composition consisting of a liquid,

as also expressly recited in claim 1. Mannesmann Demag Corp v. Engineered Metal Products Co., 793 F.2d 1279, 230 U.S.P.Q. 45 (Fed. Cir. 1986). ("Consisting of" is a special term in patent law meaning that the claim is "closed to the inclusion of materials other than those recited except for impurities ordinarily associated therewith.")

The newly cited Volk patent teaches that a composition containing an organic ester (specifically, a C_1 - C_4 dialkyl ester of a C_4 - C_6 aliphatic dibasic acid) and at least 40 wt.% N-methyl-2-pyrrolidone or analog can be used to remove paint. Similarly, the Gaul patent teaches that a composition containing an organic ester (specifically, dimethyl and diethyl esters of adipic, glutaric and succinic acids) and at least 10 wt.% of γ -butyrolactone can be used to remove paint. However, as can be seen from the attached MSDS's, both of these additional compounds, i.e., both N-methyl-2-pyrrolidone and γ -butyrolactone, are eye irritants. Moreover, N-methyl-2-pyrrolidone has an MIR of 2.79, as can be seen from the attached table of MIR values. Therefore, these patents also fail to disclose or suggest the inventive process in which an organic

component is removed from a surface using a cleaning composition which is **not classified as an** eye irritant under 16 CFR 1500.42 and which consists essentially of the indicated cleaning members, as now recited in claim 1.²

The additionally cited Wilkins patent also fails to disclose or suggest the present invention. Although this patent does show that various types of paints including polyurethanes and epoxies can be removed with cleaning compositions containing organic esters, a critical feature of the Wilkins cleaning compositions is that they contain a significant amount of a peroxide. If they do not, they fail for their intended purpose. See, Example E of the Wilkins patent which shows no removal when peroxide is absent. Accordingly, this patent also fails to disclose or suggest removing a common household organic component from a surface using a cleaning composition which is **not classified as an eye irritant** under 16 CFR 1500.42 and which **consists essentially of** the indicated cleaning members, as now recited in claim 1.³

In this connection, it is important to note that the inventive process is directed primarily to removing dried latex paint and other common household organic contaminants (including uncured organic solvent based paints), as described at the bottom of page 2 of the specification and expressly recited in claims 2 and 27. It is not directed to removing more tenacious organic coatings such as those commonly found in many industrial applications and described in most of the references cited against the claims. For example, it is not directed to removing the polyurethane and epoxy/polyimide coatings of Example 2E of the Wilkins patent. Thus, Example 2E of the Wilkins patent does not anticipate or suggest the inventive process as now claimed, since no removal occurred of an organic coating which is more tenacious than the organic contaminants being claimed.

Finally, Applicant again respectfully traverses the anticipation rejection based on the Yezrielev patent, insofar as it applies to the claims as amended. The gist of the disclosure at col. 6, lines 5-7 is that the fluid and fluid blends of this patent can be used to wholly or partially replace previously-used liquids in every process known to man. Moreover, the Yezrielev patent is clear that "[f]luid applications are broad, varied, and complex, and each application has its own set of characteristics and requirements." See, col. 1, lines 22-25.

² The N-methyl-2-pyrrolidone and γ -butyrolactone of Volk and Gaul have also not been specifically tested by Applicant according to 16 CFR 1500.42.

Wilkins's cleaning compositions have also not been specifically tested by Applicant according to 16 CFR 1500.42.

Thus, to achieve the present invention from the disclosure of this patent, one of ordinary skill in the art⁴ would not only have to select the particular cleaning ingredients recited in Applicant's claims from the rather long list of possibilities set forth in col. 13, lines 5 to 36 but also choose the particular application recited in Applicant's claims (i.e., removing an organic contaminant from a surface) from the almost infinite number of possibilities also set out in the specification of this patent. Moreover, this would have to be done without any suggestion from this patent regarding which particular organic solvents should be used for cleaning processes in general and for cleaning organic contaminants such as dried latex paints in particular.

As indicated in the previous Amendment, the Federal Circuit has made clear that:

"... rejections under 35 USC 102 are proper only when the claimed subject matter is identically disclosed or described in "the prior art." Thus, for the instant rejection under 35 USC 102. .. to have been proper, the Flynn reference must clearly and unequivocally disclose the claimed compound or direct those skilled in the art to the compound without any need for picking, choosing and combining various disclosures not directly related to each other by the teachings of the cited reference." (emphasis added) In re Arkley et al., 455 F.2d 586, 172 USPQ 524 (CCPA 1972)

Here, the total possible combinations of organic solvents on the one hand and processes for using such solvents on the other hand are almost endless. Moreover, there is simply no disclosure fairly associating particular solvents described in this patent with particular processes described in this patent, at least insofar as Applicant's claims are concerned. Therefore, this patent simply fails identically describe the subject matter recited in the claims now in the case in the sense of the <u>Arkley</u> case.

If any additional fees are due with this Amendment, please charge our Deposit Account No. 03-0172.

Respectfully submitted,

John E. Miller, Reg. No. 26,206 (216)622-8679

⁴ Which particular art this might be is completely unknown, since just about every field of technology known to man which uses a liquid in any way for any purpose appears to be covered by this disclosure.

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DIRECT DIAL PHONE NUMBER: 216-622-8679

CLIENT NO.: 27200/04005

CLIENT NAME: Magic American

NUMBER OF PAGES (including this page): 14

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Title: IMPROVED LATEX PAINT REMOVER

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CLIENT NAME: Magic American

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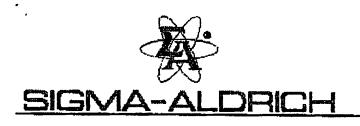
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PAGE 3 OF 15



Material Safety Data Sheet

Date Printed: 10/06/2003 Date Updated: 09/08/2002 Version 1.60

Section 1 - Product and Company Information

Product Name

1-METHYL-2-PYRROLIDINONE, 89+%, HPLC GRADE

Product Number

270458

Brand

Fax:

Aldrich Chemical

Company

Sigma-Aldrich

Street Address City, State, Zip, Country 3050 Spruce Street SAINT LOUIS, MO 63103 US

Technical Phone:

314 771 5765

800 325 5052

Emergency Phone:

414 273 3850 Ext. 5998

Section 2 - Composition/Information on Ingredient

Substance Name 1-METHYL-2-PYRROLIDINONE

CAS# 872-50-4 **SARA 313**

Formula

C5H9N0

N-Methylpyrrolidinone, N-Methyl-2-pyrrolidinone, 1-Methyl-2-pyrrolidinone, 1-Methyl-5-pyrrolidinone, Synonyme

N-Methyl pyrrolidone, N-Methyl-alpha-pyrrolidone, N-Methyl-2-pyrrolidone, 1-Methyl-2-pyrrolidone,

Section 3 - Hazards Identification

Emergency Overview

Irritant.

Irritating to eyes and skin.

Combustible. Target organ(s); Bone marrow, Spleen, Calif. Prop. 65 reproductive hazard,

HMIS Rating

Health: 2*

Flammability: 2

Reactivity: 1

NFPA Rating

Health: 2

Flammability: 2

Reactivity: 1

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

Oral Exposure

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Dermal Exposure

in case of contact, immediately wash skin with soap and copious amounts of water.

^{*}additional chronic hazards present,

₩ 003 PAGE 4 OF 15

Eye Exposure

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measurea

Flammable Hazards:

Yes

Flash Point:

187 °F

86 °C

Explosion Limits:

Lower: 1.3 %

Upper: 9.5 %

Autoignition Temp:

270 ℃

Flammability:

Yes

Extinguishing Media

Suitable

Water apray. Carbon dioxide, dry chemical powder, or appropriate foam.

Firefighting

Protective Equipment

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(s)

Emits toxic fumes under fire conditions. Combustible liquid.

Section 6 - Accidental Release Measures

Procedure(e) of Personal Precaution(s)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up

Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling

User Exposure

Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

Storage

Suitable

Keep tightly closed. Keep away from heat and open flame. Store in a cool dry place.

Special Requirements

Moisture sensitive Store under inert gas.

Section 8 - Exposure Controls / PPE

Engineering Controls

Mechanical exhaust required. Safety shower and eye bath.

Personal Protective Equipment

Respiratory

Government approved respirator.

Hand

Compatible chemical-resistant gloves.

Eye

Chemical safety goggles.

Method: closed cup

Method: closed cup

2004

General Hygiene Measures
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance

Physical State

Color

Liquid

Colorless

Molecular Weight:

99.13 AMU

Property

<u>Value</u> 7.7 - 8

ρН

78 - 79 ℃

BP/BP Range MP/MP Range

-24 °C

Freezing Point Vapor Pressure -23.6 °C 0.29 mmHg

Vapor Density

3.4 g/l N/A

Saturated Vapor Conc. SG/Density

1.032 g/cm3

Bulk Density Odor Threshold N/A N/A

Volatile% VOC Content Water Content

N/A N/A < 0.01 %

Solvent Content Evaporation Rate Viscosity N/A N/A 0.002 Pas

Viscosity Surface Tension

40.7 mN/m

Partition Coefficient Decomposition Temp.

Log Kow: -0.46 N/A

Flash Point °F Flash Point °C Explosion Limits 187 °F 86 °C Lower: 1,3 %

Flammability Autolgnition Temp Upper: 9.5.% N/A 270 °C

Refractive Index

1.47

Solubility

Other Solvents: MISCIBLE IN WATER, LOWER, ALCOHOLS AND KETONE, ETHYL ACETATE, CHLROFORM, BENZENE.

At Temperature or Pressure

12 mmHg

20 ℃

20 °C

N/A = not evailable

Section 10 - Stability and Reactivity

Stability

Stable

Stable.

Conditions to Avoid

Protect from moisture.

Materials to Avoid

Strong acids, Strong oxidizing agents.

Hazardous Decomposition Products Hazardous Decomposition Products

Carbon monoxide, Carbon dioxide.

Hazardous Polymerization Hazardous Polymerization

Will not occur.

Section 11 - Toxicological Information

Route of Exposure

Skin Contact

Causes skin irritation.

Skin Absorption

May be harmful if absorbed through the skin.

Eye Contact

Causes eye irritation.

Inhelation

May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.

ingestion

May be harmful if swallowed.

Target Organ(s) or System(s)

Bone marrow. Thymus, Spicen. Lymphatic system.

Signs and Symptoms of Exposure

Prolonged exposure can cause: Stomach pains, vomiting, diarrhea, Rats exposed to 1-methyl-2-pyrrolidinone at a concentration of 1 mg/L as an aerosol for 10 days showed depletion of hematopoletic cells in the bone marrow and atrophy of the lymphoid tissues of the thymus, spleen, and lymph nodes.

RTECS Number: UY5790000

Toxicity Data

Oral - Rat: 3,914 mg/kg (LD50)

Intraperitoneal - Rat: 2472 MG/KG (LD50) Subcutaneous - Rat: >2 GM/KG (LD50) Intravenous - Rat: 80500 UG/KG (LD50)

Oral - Mouse: 5,130 mg/kg (LD50)

Intraperitoneal - Mouse: 3050 MG/KG (LDS0) Intravenous - Mouse: 54500 UG/KG (LD50) Intravenous - Dog: 63300 UG/KG (LD50)

Skin - Rabbit: 8,000 mg/kg (LD50)

Irritation Data

Eyes - Rabbit: 100 mg

Remarks: Moderate irritation effect

Chronic Exposure Carcinogen

Mouse - Oral: 784 GM/KG 78W C

Result: Tumorlgenic:Carcinogenic by RTECS criteria. Liver:Tumors.

Chronic Exposure - Teratogen

<u>Species</u> <u>Dose</u>

Flourie of Application 9700 MG/KG Oral

Exposure Time (6-15D PREG)

Result: Effects on Embryo or Fetus: Fetal death.

Specific Developmental Abnormalities: Other developmental abnormalities.

Rat

Rat

116 PPM/GH

Inhalation

(MULTIGENERATION

Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

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Page 4

Chronic Exposure - Reproductive Hazard

<u>Species</u> Rat

<u>Dose</u> 150 PPM/6H **Route of Application**

Exposure Time (7-20D PREG)

Inhalation

Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Delayed effects,

7500 MG/KG

Skin

(6-15D PREG)

Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Rat

Rat

7500 MG/KG

(6-15D PREG)

Result: Maternal Effects: Other effects. Specific Developmental Abnormalities: Musculoskeletal system.

Rat 166 MG/KG

intraperitoneal

(9D PREG)

Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Spedfic Developmental Abnormalities: Central nervous system. Specific Developmental Abnormalities: Musculoskeletal

Mouse

12825 MG/KG

Oral

(11-15D PREG)

Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

7825 MG/KG

Intraperitoneal

(11-15D PREG)

Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

Section 12 - Ecological Information

Acute Ecotoxicity Teste

Test Type EC50 Daphnia Species

Daphnia magna

Time: 24.0 h Value:

> 1,000 mg/l

Test Type IC50 Algae

Time: 72.0 h

Value:

> 500 mg/l

Test Type LC50 Bacteria

Value:

> 9,000 mg/l

Test Type LC50 Fish

Time: 96.0 h

Value: 4,000 mg/l

Elimination

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation

Contact a licensed professional waste disposal service to dispose of this material.

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber,

Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

Proper Shipping Name: Combustible liquid, n.o.s.

UN#: 1993

Class: COMBUSTIBLE LIQUID Packing Group: Packing Group III

Hazard Label: None.

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Page 5

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W 007 PAGE 8 OF 15

PIH: Not PIH

IATA

Non-Hazardous for Air Transport. Non-hazardous for air transport.

Section 15 - Regulatory Information

EU Directives Classification

Symbol of Danger: Xi Indication of Danger

inflant.

Risk Statements

R: 36/38

irritating to eyes and skin.

Safety Statements

S: 41

In case of fire and/or explosion do not breathe fumes.

US Classification and Label Text

Indication of Danger

irritant.

Risk Statements

Imitating to eyes and skin.

Safety Statements

In case of contact with eyes, rinse immediately with pienty of water and seek medical advice. Wear suitable protective clothing. In case of fire and/or explosion do not breathe furnes.

US Statements

Combustible, Target organ(s): Bone marrow, Spleen, Callf. Prop. 65 reproductive hazard,

United States Regulatory Information

SARA Listed: Yes Deminimie: 1 %

Notes: This product is subject to SARA section 313 reporting requirements.

TSCA inventory item: Yes

United States - State Regulatory Information

California Prop - 65

This product is or contains chemical(s) known to the state of California to cause developmental toxicity.

Canada Regulatory Information

WHMIS Classification

This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes NDSL: No

Section 16 - Other Information

Disclaimer

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Material Safety Data Sheet

Date Printed: 10/06/2003 Date Updated: 04/16/2003 Version 1,40

Section 1 - Product and Company Information

Product Name

γ-Butyrolactone, 89+%

Product Number

B103608

Brend

Aldrich Chemical

Company Street Address Sigma-Aldrich

City, State, Zip, Country

3050 Spruce Street SAINT LOUIS, MO 63103 US

Technical Phone:

314 771 5765

Fax:

800 325 5052

Emergency Phone:

414 273 3850 Ext. 5996

Section 2 - Composition/Information on Ingredient

Substance Name
GAMMA-BUTYROLACTONE

<u>CAS #</u> 96-48-0 **SARA 313**

Formula Synonyme

C4H6O2

gamma-6480. Agrisynth BLO. gamma-BL, 4-Butanolide, 1,2-Butanolide, 1,4-Butanolide, Butyric acid, 4-hydroxy-, gamma-lactone, Butyric acid lactone, Butyrolactone, gamma-Butyrolactone, 4-Butyrolactone, Butyrylactone, Butyrylactone, C-1070, 4-Deoxytetronic acid, Dihydro-2(3H)-furanone, 4-Hydroxybutanoic acid lactone, 4-Hydroxybutanoic acid, gamma-lactone, gamma-Hydroxybutyric acid cyclic ester, 4-Hydroxybutyric acid lactone, 4-Hydroxybutyric acid, gamma-lactone, gamma-Hydroxybutyric acid lactone, gamma-Hy

Section 3 - Hazards Identification

Emergency Overview

Harmful.

Harmful if swallowed, initiating to eyes. Target organ(s): Central nervous system.

HMIS Reting

Health: 2*

Flammability: 1

Reactivity: 1

NFPA Rating

Health: 2

Flammability: 1

Reactivity: 1

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Ald Measures

Oral Exposure

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

Inhalation Exposure

If inhaled, remove to fresh air, if breathing becomes difficult, call a physician.

Dermal Exposure

in case of contact, immediately wash skin with soap and copious amounts of water.

Eye Exposure

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers, Call a physician.

Section 5 - Fire Fighting Measures

Explosion Hazarda

Vapor/air mixtures are explosive at high temperatures.

Flash Point:

208.4 °F

98 °C

Explosion Limits:

Lower: 1.4 %

Upper: 18%

Autoignition Temp:

455 °C

Extinguishing Media

Suitable

Water spray. Carbon dioxide, dry chemical powder, or appropriate toam.

Firefighting

Protective Equipment

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(6)

Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Laak or Spill

Evacuate area.

Procedure(s) of Personal Precaution(s)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up

Absorb on sand or vermiculitie and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling

User Exposure

Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

Storage

Suitable

Keep tightly closed.

Special Requirements

Hygroscopic,

Section 8 - Exposure Controls / PPE

Engineering Controls

Safety shower and eye bath. Mechanical exhaust required.

Personal Protective Equipment

Respiratory

Government approved respirator.

Hand

Compatible chemical-resistant gloves.

Eye

Chemical safety goggles.

General Hygiene Measures

Wash thoroughly after handling,

Section 9 - Physical/Chemical Properties

Appearance

Physical State

Color

Clear liquid

Coloriess

Molecular Weight:

86.09 AMU

Property	<u>Value</u>
pН	N/A
BP/BP Range	204 - 205 °C
MP/MP Range	-45 °C
Freezing Point	NA
Vapor Pressure	1.5 mmHg
Vapor Density	3 g/l
Saturated Vapor Conc.	N/A
SG/Density	1.129 g/cm3
Bulk Density	N/A
Odor Threshold	N/A
Volatile%	N/A
VOC Content	N/A
Water Content	N/A
Solvent Content	N/A
Evaporation Rate	N/A
Viscosity	N/A
Partition Coefficient	Log Kow: -0.57
Decomposition Temp.	N/A
Flach Point °F	208.4 °F
Flash Point °C	98 °C
Explosion Limite	Lower: 1.4 %
= 1	Upper: 16 %

N/A

455 °C

1.437

At Temperature or Pressure

760 mmHg

20 ℃

Method: closed cup Method: closed cup

Flammability

Autoignition Temp

Refractive Index

Solubility

N/A

N/A = not available

Section 10 - Stability and Reactivity

Stability

Stable

Stable.

Conditions of Instability

Нудговсоріс.

Materials to Ayoid

Strong acids, Strong bases, Strong oxidizing agents, Strong reducing agents, Zinc, Plastics.

Hazardous Decomposition Products

Hazardous Decomposition Products

Carbon monoxide, Carbon dioxide.

Hazardous Polymerization

Hezerdous Polymerization

Will not occur.

Section 11 - Toxicological Information

Route of Exposure

Skin Contact

May cause skin imitation.

Skin Absorption

May be harmful if absorbed through the skin.

Eye Contact

Causes eye irritation.

Inhelation

May be harmful if inhaled. Material may be Irritating to mucous membranes and upper respiratory tract.

ingestion

Harmful if swallowed.

Target Organ(s) or System(s)

Central nervous system.

Signs and Symptoms of Exposure

Inhalation may have an anesthetic effect on the central nervous system characterized by a loss of sensation. Preliminary excitement is the initial effect followed by relaxation, stupor, or sleep. Exposure can cause: Nausea, dizziness, and headache.

RTECS Number: LU3500000

Toxicity Data

Oral - Rat: 1,540 mg/kg (LD50)

Remarks: Behavioral:Altered sleep time (including change in righting reflex).

Behavioral:Somnolence (general depressed activity).

Lungs, Thorax, or Respiration:Respiratory depression.

inhalation - Rat: > 5,100 mg/m3 (LC50)

Intraperitoneal - Rat: 1 GM/KG (LD50)

Remarks: Behavioral:General anesthetic.

Lungs, Thorax, or Respiration: Other changes.

Orel - Mouse: 1,460 mg/kg (LD50)

Remarks: Behavioral:General anesthetic.

Behavioral:Somnolence (general depressed activity). Lungs, Thorax, or Respiration: Respiratory depression.

Intraperitoneal - Mouse: 1100 MG/KG (LD50) Remarks: Behavioral:General anesthetic.

Aldrich Chemical - B103808

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Page 4

Lungs, Thorax, or Respiration: Other changes.

Skin - Guinea pig: > 5,000 mg/kg (LD50)

Irritation Date

Skin - Rabbit: 0.5 ml

Remarks: Severe irritation effect

Chronic Exposure - Carcinogen

Result: This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Mouse - Oral: 191 GM/KG 2Y C

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Endocrine: Adrenal cortex tumors.

Mouse - Skin: 50 GM/KG 42W I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.

Tumorigenic:Tumors at site or application.

IARC Carcinogen List

Batha Group 3

NTP Carcinogen List

Equivocal evidence.

No evidence.

Species | Mouse

<u>Route</u>

Gavage Gavage

Chronic Exposure - Teratogen

Species Rat

<u>Dose</u>

Route of Application

Exposure Time

500 MG/KG Oral (8-15D PREG) Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Chronic Exposure - Mutagen

Species

Dose

25 MG/L

Cell Type kidney

Mutation test

Hamster

ovary

Morphological transformation. Cytogenetic analysis

Hamster Hamster 2580 MG/L 4940 MG/L

ovary

Sister chromatid exchange

Chronic Exposure - Reproductive Hazard

<u>Species</u>

<u>Dose</u> 25 GM/KG Route of Application Oral

Exposure Time (20D MALE)

Result: Paternal Effects: Testes, epididymis, sperm duct.

Section 12 - Ecological Information

Acute Ecotoxicity Tests

Test Type LC50 Fish Species

Leuciscus Idus

Time: 96.0 h Value:

> 220 mg/l

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation

Contact a licensed professional waste disposal service to dispose of this material.

Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Observe all federal, state, and local environmental regulations.

10/06/03 MON 15:17 FAX 216 464 5895 MAGIC AMERICAN CORP 10/08/2003 01:23F Sigma-Aldrich

Section 14 - Transport Information

DOT

Proper Shipping Name: None

Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA

Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU Additional Classification

Symbol of Danger: Xn

Indication of Danger

Harmful.

Risk Statements

R: 22 36

Harmful if swallowed. Irritating to eyes.

Safety Statements

S: 26 36

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing.

US Classification and Label Text

Indication of Danger

Harmful.

Risk Statements

Harmful If swallowed, Irritating to eyes.

Safety Statementa

in case of contact with eyes, rinse immediately with pienty of water and seek medical advice. Wear suitable protective clothing.

US Statements

Target organ(s): Central nervous system.

United States Regulatory Information

SARA Listed: No

TSCA inventory Item: Yes

Canada Regulatory Information

WHMIS Classification

This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes NDSL: No

Section 16 - Other Information

For R&D use only. Not for drug, household or other uses.

Warranty

The above Information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. Sigma-Aldrich inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2003 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

RECEIVED MAY 2 9 1992.

PEPCET NUMBER: 971 DS NO: P2466

VAN WATERS & ROGERS INC. MATERIAL SAFETY DATA SHEET PAGE: 001

EFFECTIVE DATE: 10/25/90

VERSION: 010

10syyq-Mi

PRODUCT: N-METHYLPYRROLIDONE.

ORDER NO: PROD NO 1

. SUBSIDIARY OF UNIVAR VAN WATERS & ROGERS INC. , KIRKLAND . WA · 98033 6100 CARILLON POINT

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CREMTREC (800)424-9300

------- FOR PRODUCT AND SALES INFORMATION ----------

. COMIACT YOUR LOCAL VAN WATERS & ROCERS BRANCH OFFICE AT 216-425-4330 TWINSBURG , OH VWER CLEVELAND

PRODUCT NAME: N-METHYLPYRROLIDONE

CAS NO.: 872-60-4

MSD5 #1 P2466

CONHON NAMES/STHONYMS: M-PIROL M-METHYLPYRROLIDONE; NMP; N-METHYL Z PYRROLIDONE

ELECTRONIC GRADE

DATE ISSUED: 10/90 FORMULA: C5 N9 N O

SUPERCEDES: 04/90 HOLECULAR WEIGHT: 99.1

HAZARD RATING (MANUFACTURER)

HMIS RATING

HAZARD RATING SCALE REALTH: 2 O=MINIMAL 3=SERIOUS FIRE; 2 4 = SEVERE REACTIVITY: 0 1 = SLIGHT SPECIAL: NONE

2 = MODERATE

HEALTH: 2 FIRE: 2

REACTIVITY: 0

-----HAZARDOUS INGREDIENTS-----

EXPOSURE LIMITS, PPM OSHA ACGIH OTHER

LIMIT HAZARD % PEL TLV COMPONENT

OCT-21-192 WED 15:05 ID:SCOT LABORATORIES TEL NO:216-543-1825

M-PYROL

REPORT NUMBER: 971 DS NO: P2466 VAN WATERS & ROCERS INC. MATERIAL SAFETY DATA SHEET PAGE: DOZ

VERSION: 010

PRODUCT: N-METHYLPYRROLIDONE

EFFECTIVE DATE: 10/25/90

ORDER NO: PROD NO:

- H-METHYLPYRROLIDONE > 59 NONE NONE 100 COMBUSTIBLE (BASE)

BOILING POINT, DEG F: 395

MELTING POINT. DEG F: H/A

SPECIFIC GRAVITY (WATER #1): 1.027

VAPOR TRESSURE, MM HG: <1

pH: 7.7-8.0 (100 G/L WATER)

VAFOR DENSITY (AIR=1): 3.4

WATER SOLUBILITY %: 100

EVAPORATION RATE (BUTYL ACETATE = 1): <1

__VOLATILE (BY VOLUME): 100

AFPEARANCE AND ODOR: CLEAR, COLORLESS LIQUID: SLICHT AMINE ODOR.

IF IMMALED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING, GET IMMEDIATE MEDICAL ATTENTION.

"------FIRST AID MEASURES-------

IN CASE OF EYE CONTACT: IMMEDIATELY FLUSH EYES WITH LOTS OF RUNNING WATER FOR 15 MINUTES. LIFTING THE UPPER AND LOWER EYELIDS OCCASIONALLY. GET IMMEDIATE HEDICAL ATTENTION.

IN CASE OF SKIN CONTACT: INHEDIATELY WASH SKIN WITH LOTS OF SDAP AND WATER. REHOVE CONTAMINATED CLOTHING AND SHOES: WASH BEFORE REUSE. GET MEDICAL ATTENTION IF IRRITATION PERSISTS AFTER WASHING.

IF SWALLOWED: IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING BY GIVING 2 GLASSES OF WATER AND STICKING A FINGER DOWN THE THROAT. GET IMMEDIATE NEDICAL ATTENTION. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSING PERSON.

NOTES TO PHYSICIAN: NOME

-----HEALTH HAZARD INFORMATION-----

IMARY ROUTES OF EXPOSURE: SKIN OR EYE CONTACT

SIGNS AND SYMPTOMS OF EXPOSURE

M-PYROL

REPORT NUMBER: 971 MSD5 NO: P2466

VAH WATERS & ROGERS INC. MATERIAL SAFETY DATA SHEET

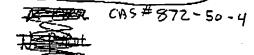
PAGE: 003

VERSION: 010

PROD NO 1 .

EFFECTIVE DATE: 10/26/90

PRODUCT: N-WETHYLPYRROLIDONE



ORDER NO:

INHALATION: PROLONGED OR REPEATED EXPOSURE OR EREATHING VERY HIGH CONCENTRATIONS HAY CAUSE HEADACHES, NAUSEA, AND VOMITING.

EYE GONTACT: VAPORS WILL IRRITATE THE EYES. LIQUID AND MISTS WILL IRRITATE AND MAY CAUSE TEMPORARY CORNEAL CLOUDING.

SKIN CONTACT: BRIEF CONTACT MAY DRY THE SKIN. PROLONGED OR RE-

SWALLOWED: INGESTION OF LARGE AMOUNTS MAY CAUSE GASTRIC DISTURBANCES.

CHRONIC EFFECTS OF EXPOSURE: NO SPECIFIC INFORMATION AVAILABLE.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NOME KNOWN,

ORAL: RAT LDEO = 3,600 MG/KG

DERMAL: RABEIT LDSO # 8.000 MG/KG

INHALATION: NO DEATHS AFTER 8 HOURS EXPOSURE TO SATURATED VAPORS.

CARCINGGENICITY: THIS MATERIAL IS NOT CONSIDERED TO BE A CARCINGGEN BY THE NATIONAL TOXICOLOGY PROGRAM, THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER. OR THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

OTHER DATA: CONTACT WITH THE LIQUID RESULTS IN EYE IRRITATION AND MAY CAUSE TEMPORARY CORNEAL CLOUDING. FROLONGED SKIN CONTACT CAUSES IRRITATION, REDNESS AND DEFATTING. INGESTION OF LARGE AMOUNTS MAY CAUSE GASTRIC DISTURBANCES. IN ANIMAL STUDIES IN RATS AND MICE, NMP WAS EMBRYOTOXIC BY THE QRAL AND INTRAFERITOMEAL ROUTES AT VERY HIGH DOSE LEVELS WHICH WERE CLOSE TO THE LDSO.

IN A DERHAL EXPOSURE STUDY WITH RATE, NMP WAS ONLY EMBRYOTOXIC AT THE LIGH DOSE LEVEL; THIS EFFECT WAS ATTRIBUTED TO MATERNAL TOXICITY. SEVERAL INHALATION STUDIES IN RATE DID NOT REVEAL ANY INDICATION OF MATERNAL COMICITY OR EMBRYOTOXICITY. IN A TWO YEAR INHALATION STUDY, NMP DID NOT LAUSE ANY LIFE-SHORTENING OR CARCINOGENIC EFFECTS IN RATE AT 0.04 OR 0.4

TIC TOXICITY:

LUE CILLS (LEPOMIS MACROCHIRUS) LCSO - BSZ MG/L

MATERIAL SAFETY DATA _HEET (5-500)

GAMMA BUTYROLACTONE

MISOS NO PODDS77-1-OSHA-AE MSDS CLASS H Ver, No 1 Var. Date NOV 3 93



ARCO Chemical Company 3801 West Chester Pike Newtown Square PA 19073 USA

IMPORTANT: Read this MSDS before handling and disposing of this product and pass this information on to the employees, customers, and users of this product.
This product is covered by the OSHA Hazard Communication Rule and this document has been prepared in accord with the MSDS requirements of this nule.

			1. Gen	eral		
			· · · · · · · · · · · · · · · · · · ·		Telephone Nun	nbers:
Trade Name	GAMMA BUTYRO	DLACTORE	<u>, </u>		EVERGENCY	
Other ACC Names	GBL				800/424-930 610/359-830 CUSTOMER S	O ARCO CHEM
Synonyms	None			- 4.6	800/321-700	O INFO ONLY
Other Industry Names	Dihydro-2(3H)-Fu	ranone, Gamma Hydr	oxy Butyric	Acid Lacione: 4-1	Suryrolactone	r Shipping Name
Chemical Family	Lactones			Not regulated		
Generic Name "	Gamma Butyrola	ctone		DOT Hazard Cla Not regulated	13S	DOT Reportable Quantity N/AP
CAS No. (See S	ection 9 - nents)	ACC Material ID	BE268		UN/NA ID No.	NAP
		2. 3	Summery	of Hazards		
Signal Word	WARNING					•
Physical Hazards	Slightly combust	ible liquid		•		
cute Health Effects (Short-Term)	Moderate inhalat Severe eye imita	nt >				
(districting)	Clint inspetion	hazard identified from	data availat	ble		
	Slight skin absor	ption hazard				
Chronic Health Effects (Long-Term)		ctone was not carcino Il teratogenic in limited Health Hazards - Sun	Texas in Fais	i	subcuraneous in	iection, or dermal administration, nor
				Explosion		A STATE OF THE STA
Flash Point AP 209 °F (SETA)		Autoignition Temper AP 820 °F			Lower, AP 3.6 Upper, AP 16	mospheric Temp and Pressure) 5 (% vol in air) (% vol in air)
Fire and Explosion Hazards		an generate flammable nfined. Vapors may be . Fine sprays/mists ma				grition source, vapors can burn in open ong ground before igniting/flashing back ral flash point.
Extinguishing Media	CO2 Dry chemical Foam Water spray Water fog					
Extinguishing Media Use Comment	•	formation available	<u>.</u>		Landa - Da-	
Special Firefighting Procedures	safe distance/p	e area without proper rotected location. Hea Do not use solid water ring liquid will float on	may build	research fire like	water sorav/foo 1	mposition Products), Fight fire from a spreading fire, increasing risk of for cooling. Avoid frothing/steam public waters.

MSDS No P000677-1-OSHA-AE

GAMMA BUTYROLACTONE

	4. Health Hazards	
Summary of Acute	High health hazard - see below for route-specific details.	
ROUTE OF EXPOSURE	SIGNS AND SYMPTOMS	PRIMARY ROUTE(S)
Inhalation	No appropriate human or animal health effects data are known to exist.	Yes
Eye Contact	May cause severe eye imitation.	Yes
Skin Absorption	Extensive/prolonged or repeated exposure to this material can result in significant absorption.	Yes
Skin Imitation	No significant signs or symptoms indicative of any adverse health hazard are expected to occur as a result of skin exposure.	No
Ingestion	This material may be a slight health hazard if ingested in large quantities.	No
Summary of Chronic Hazards	Gamma-butyrolactione was not carcinogenic in rats or mice by oral, subcutaneous injection, or dermal admini was the material teratogenic in limited tests in rats. (See Section 11 - Additional Toxicological Information).	stration, nor
Special Health Effects	This material or its emissions may aggravate pre-existing eye disease.	
	5. Protective Equipment and Other Control Measures	
Respiratory	No occupational exposure standards have been developed for this material. Where exposure through inhalatifrom use, NIOSH/MSHA approved respiratory protection equipment is recommended.	
Eye	Eye protection, including both chemical splash goggles and face shield, must be worn when possibility exists due to splashing/spraying liquid, airborne particles, or vapor. Contact lenses must not be worn.	
Skin	Depending on the conditions of use, protective gloves, apron, boots, head and face protection should be work equipment must be cleaned thoroughly after each use.	
Engineering Controls	At elevated temperatures, special ventilation may be required even if the flash point has not been exceeded, mists or zerosols can be generated below the flash point of high boiling liquids.	
Other Hygienic Practices	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any pote	
Other Work Practices	Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. remove soiled clothing/wash thoroughly before reuse. Shower after work using plenty of soap and water.	Promptly
	6. Occupational Exposure Limits	
Substance	Source Date Type Value/Units Time	e Skin
No established standard Industrial Hygiene Comments	No additional Occupational Exposure Limit information available	
·	7. Emergency and First Aid	
Inhalation	If overcome by exposure, remove victim to fresh air immediately. Give oxygen or artificial respiration as nee emergency medical attention. Prompt action is essential.	
Eye Contact	In case of eye contact, immediately rinse with clean water for 20-30 minutes. Retract eyelids often. Obtain emedical attention.	
Skin Contact	Remove conterminated clothing as needed. Wash skin thoroughly with mild scap and water. Flush with luke 15 minutes. If sticky, use waterless cleaner first.	
Ingestion	If large quantity swallowed, give lukewarm water (pint) if victim completely conscious/alert. Do not induce voir firsk of damage to lungs exceeds poisoning risk. Obtain emergency medical attention.	
Emergency Medical Treatment Procedures	Induce vomiting with syrup of ipecac if patient is awake/alert. Treat symptomatically. Gastric lavage indicate emptying.	
	Following gestric emptying either by induced vorniting or gastric lavage, administer an aqueous slurry of act	vared charco



GAMMA BUTYROLACTONE

MSDS No P000677-1-OSHA-AE Ver. Date NOV 3 93

Spill and Disposal

Precautions if Material is Spilled or Released

May contaminate water supplies/pollute public waters. Evacuate/limit access. Equip responders with proper protection (See Section 5 - Protective Equipment). Prevent flow to sewers/public waters. Stop release. Notify fire and environmental authorities. Restrict water use for cleanup. Slippery walking. Spread granular cover. Impound/recover large land spill. Soak up small spill with inert solids. Use suitable disposal containers. On water, material soluble/may float or sink. May biodegrade. Contain/minimize dispersion/collect. Disperse residue to reduce aquatic harm. Report per regulatory requirements.

Contaminated product/soil/water may be RCRA/OSHA hazardous waste due to potential for eye irritation/water pollution. (See 40 CFR 261 and 29 CFR 1910). Landfill solids at permitted sites. Use registered transporters. Burn concentrated liquids in systems compatible with water soluble wastes. Avoid flameouts. Assure emissions comply with applicable regulations. Dilute/aqueous waste may biodegrade. Avoid overloading/poisoning plant biomass. Assure effluent complies with applicable regulations.

9. Components

(This may not be a complete list of components.)

(Compositions are typical values, not specifications.)

Component Name Gamma-Butyrolacione CAS No. 96-48-0

Composition Amount (Wt.) GT 98

Carcinogen ###

NP

1 = National Toxicology Program 2 = International Agency for Research on Cancer 3 = Occupational Health and Safety Administration 4 = Other

10. Component Health Hazards

Component

amma Butyrolactone

Component Health Hazards (See Section 11 - Addi'l Tox Info.)

11. Additional Toxicological Information

Component Name/Comments

Overexposure to Gamma-Butyrolactone is expected to cause symptoms of Central Nervous System (CNS) depression. In experimental animals (dosed orally or by injection) changes in levels of neurotransmitters have been reported. Behavioral changes in these experimental animals consistent with changes in neurotransmitter levels were noted in these studies.

Material

No additional toxicology information is available for this material.

Physical and Chemical Data

II			
Bailing Point AP 400 °F	Viscosity AP 2 CPS (at 68° F) (Brookfield)	Dry Point N/AP	
Freezing Point AP -46 °F	Vapor Pressure AP 1.5 MM HG (et 68° F)	Volatile Characteristics Slight	
Specific Gravity AP 1,12 (H2O = 1.0 at 39.2° F)	Vapor Specific Gravity GT 3 (Air = 1.0 at 60-90° F)	Solubility in Water Miscible	
pH AP 7 to 8	Hazardous Polymerization Not expected to occur	Stability Stable	

Other Chemical Reactivity

No additional information available

Other Physical and

No additional information available

Therrical Properties

Appearance and Odor

Clear, colorless; Liquid; Little or no odor

Conditions to Avoid

Heat, sparks, open flame, other ignition sources, and oxidizing conditions

MSDS No PODOSTT-1-OSHA-AE

GAMMA BUTYROLACTONE .

	12. Physical and Chemical Data (Confd)
Materials to Avoid	Strong acids, Strong bases, Strong oxidizing agents
Hazardous Decomposition Products	Incomplete combustion may produce carbon monoxide and other toxic gases
: ::	13. Hazards Rating Information
National Fire Protection A No hazards rating informa	sociation ion is available for this system
National Paint and Coatin	s Association
Hazardous Materials Info	mation System (HMIS) tion is available for this system
	14. Additional Precautions
Handling and Storage Pro Store in tightly closed/pro	cedures perly vented containers. Store away from heat, sparks, open flame and strong oxidizing agents.
	res material should be isolated and thoroughly drained, washed and purged prior to maintenance/repair operations. Wear



GAMMA BUTYROLACTONE

MSDS No PODDS77-1-OSHA-AE Vec Date NOV 9 93

15. Regulatory Information

FEDERAL:

Toxic Substance Control Act (TSCA)

The following is the TSCA Chemical Substance Inventory Status of the components of this material with CAS numbers listed in Section 9 -Components:

CHEMICAL

CAS NO.

STATUS

Gamma-Butyrolactone

96-48-0

1. Listed - Non Confidential

Superfund Amendments and Reauthorization Act of 1988 (SARA), Title III

- Section 302/304

Requires emergency planning based on "Threshold Planning Quantities" (TPQs), and release reporting based on Reportable Quantities (RQs) of "Extremely Hazardous Substances" (EHS) listed in Appendix A of 40 CFR 355. There are no components of this material with known CAS numbers which are on the EHS list.

Section 311 & 312

Based upon available information, this material and/or components are not classified as any of the specific health and/or physical hazards defined by Section 311 & 312.

- Section 313

The material does not contain any chemical components with known CAS numbers that exceed the De Minimis reporting levels established by SARA tle III, Section 313 and 40 CFR 372.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

No chemicals in this material with known CAS numbers are subject to the reporting requirements of CERCLA.

"Chemical-specific" OSHA regulations presented under 29 CFR 1910 do not apply to this material or its components.

Other EPA Regulations

No additional information is available.

Department of Transportation (DOT)

Other than the normal shipping instructions and information given in this MSDS, there are no other specific DOT regulations governing the shipment of this material.

STATE REGULATIONS:

California Safe Drinking Water and Toxic Enforcement Act of 1988 - Proposition 65

This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins under California Proposition 65 at levels which would be subject to the proposition.

California South Coast Air Quality Management District (SCAQMD) Rule 443.1 (VOC's)

A Volatile Organic Compound (VOC) is any volatile compound of carbon excluding methane, carbon monoxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, 1,1,1-trichloroethane, methylene chloride, (FC-23), (CFC-113), (CFC-12), (CFC-11), (CFC-22), (CFC-114), and (CFC-115). By this definition, this is a VOC material.

Massachusetts Right-to-Know Substance List (MSL) [105 CMR670.000]

Extraordinarily Hazardous Substances (MSL-EHS) must be identified when present in materials at levels greater than state specified criterion. The criterion is >= 0.0001%. Hazardous Substances (MSL-HS) on the MSL must be identified when present in materials at greater than the state specified criterion. The criterion is >= 1%. Components with CAS numbers present in this material, at levels specified in Section 9 - Components, do not require reporting under the statute.

'ew Jersey Registration

ne New Jersey, Registry 3, Registration law does not apply to this material, as none of its components are trade secrets.

MSDS No POW677-1-OSHA-AE

GAMMA BUTYROLACTONE

Regulatory Information (Cont'd) 15.

Perrsylvania Right-to-Know Hazardous Substances Lists Special Hazardous Substances (PA-SHS) must be identified when present in materials at levels greater than the state specified criterion. The criterion operation reactions considered (PA-HS) must be identified when present in materials at levels greater than the state specified criterion. The criterion is > 1%. Environmental Hazards (PA-EH) must be identified when present in materials at levels greater than the state specified criterion. The criterion is > 1%. Environmental Hazards (PA-EH) must be identified when present in materials at levels greater than the state specified criterion. The criterion is > 0.01%. Components with CAS numbers present in this material, at levels specified in Section 9 - Components, do not require

reporting under the statute.

If youtreformulate or further process this material, you should consider re-evaluation of the regulatory status of the components listed in Section 9, based on the final composition of your product



GAMMA BUTYROLACTONE

MSDS No P000677-1-OSHA-AE Ver. Date NOV 3 93

-----Label Information Telephone Numbers: Manufacturer: **EMERGENCY** ARCO Chemical Company CHEMITREC 800/424-9300 3801 West Chester Pike 610/359-8300 ARCO CHEM Newtown Square CUSTOMER SERVICE PA 19073 USA 800/321-7000 INFO ONLY Signal Word WARNING . (28) Other ACC Names For industrial use only Use Statement } Keep out of reach of children Health Hazards Physical Hazards ingestion hazard Combustible Inhalation hazard Skin contact hazard Severe eye imitant May cause long-term adverse health effects . . . Precautionary Measures Do not handle near heat, sparks, or open flame Do not store near combustible materials Avoid contect with eyes Avoid prolonged or repeated breathing of gases, vapors, or mists Avoid prolonged or repeated contact with skin Use only with adequate ventilation/personal protection Prevent contact with food, chewing, or smoking meterials Wash thoroughly after handling Do not take internally eep container closed when not in use NAP DOT Reportable Quantity DOT Hazard Class Not regulated JT Information: NAP LININA ID No. DOT Hazardous Materials Proper Shipping Name Not regulated RQ Corposition Amount (WL) CAS No. Component Name NAP 95-48-0 GT 98 Garrina-Butyrolactone In case of fire, use: CO2; Dry chemical; Foam; Water spray; Water fog Instructions If overcome by exposure, remove victim to fresh air immediately. Give oxygen or artificial respiration as needed. Obtain emergency medical First Aid: Inhalation attention. Prompt action is essential. In case of eye contact, immediately tinse with clean water for 20-30 minutes. Retract eyelids often. Obtain emergency medical attention. Eye Contact Remove conteminated clothing as needed. Wash skin thoroughly with mild soap and water. Flush with lukewarm water for 15 minutes. If sticky, Skin Contact use waterless deaner first. If large quantity swellowed, give lukewarm water (pint) if victim completely conscious/alert. Do not induce vomiling/aspiration if risk of damage Increstion to lungs exceeds poisoning risk. Obtain emergency medical attention. May contaminate water supplies/pollute public waters. Slippery walking/spread granular cover. On water, may biodegrade. Contain/minimize in case of spill, dispersion/collect. Report per regulatory requirements.

Where excessive vapor, mist, or dust exposure may result from use, use NIOSH/MSHA approved respiratory protection equipment.

SEP 1 83

Clothing such as gloves, apron, siseves, boots, and full head/face protection appropriate to conditions of use should be worn.

Date:

Both chemical splash goggles and face shield must be worn.

Version No.:

LP000577



Protective Equipment

Resoiratory

Eye

Skin

Label No.:

19/01/03 WED 14:54 FAX 216 464 5895

MSDS No P000577-1-OSHA-AE

GAMMA BUTYROLACTONE

He with a min to the state of		17. General Commer	ts
General Comments No additional information ava	lable.		
Other Comments Some of the information pres	ented and condusions draw	n herein are from sources other	than direct test data on the material itself.
Note Qualifications:	EQ=Equal LT=Less Than GT=Greater Than	AP=Approximately UK=Unknown TR=Trace	NYP=No applicable information found N/AP=Not applicable N/DA=No Data Available

Disclaimer of Liability

The information in the MSDS was obtained from sources which we believe are reliable.

HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, REGARDING ITS CORRECTNESS.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT.

This MSDS was prepared and is to be used only for this product.

If the product is used as a component in another product, this MSDS information may not be applicable.

Print Date

January 13, 1994

•	Ē	"Best Est	MIR)		Upper Limit MIR	mit Mil		U.Adj.			Ra	le Cons	ants (c	n* mole	(8)			
	C _{nc}	Z.	¥	KR	E E	뚩	2	MIR	Adj. Eff.		<u>Б</u>	н коз		<u> </u>			KN03	
			(g/g)		Tp. W	Max	(g/g)	(B/B)	кон	Value	Ref.	Note	Value	Ref.	Note	Value	Ref.	Note
Alkyl Phenols	ß	60	242	1,00	ď	32 1	14.20	2.42	9.8e-11	4.29-11	7				·	1.4B-11	2	
Alkyl Phenois		છ	75-75		Z	•	14.20	2.42	-									
Alkyi Phanois	2	9	242		Ę	•	14.20	2.42										
Alkyl Phenols	Ō	Ф	242		ď	32		2.42										•
Nitrobenzene	F	7	70.0	0.03	>			0.15	1.5e-13	1,5e-13	2,39					<i>:</i>		
Toluene Diisocyanate	1				-						•							
Ethyl Amine	Ŧ	7	10.56	1.00	Š	12	12.73	12.73	2.89-11	2.88-11	69							
Dimethyl Amine	=	13	12.16	100			12.24	12.24	6.66-11	6.6e-11	69							
Trimethyl Amine	7	12	9.58	9.0	S N		14.62	14.62	6.19-11	6.1e-11	69							
Methyl Nitrie	n				۵													
Ethanolamine	•			_	م							•						
Diethanot Amine	•				۵													
Triethanolamine	•			_	۵		Ç ı					•						
Acrylonitrile			(-													
N-Methyl-2-Pyrrolidone	ر 13	9		0.99	5		•	2.79	2.26-11	2.2e-11	20					1.30-13	20	
Methyl Chloride (explicit)					₽ :	φ,				٠.								
Methyl Chloride	ı			6	<u></u>	_	,	;	;	,								
Dichloromethane	1			3 2	<u> </u>	5 0	0.10	010	1,46-13	1.49-13	Ν (
Character Character				5			700	777	50.0	5.00°.	4							
Carton Telmohloride	1				2	•				•								
Methylene Bromide						C												
Vinvi Chlorida	•				o Z	5												
Ellyl Chloride	•				ď	1 2												
Trans-1,2-Dichloroethens	•				ď	12												
1,1-Dichloroethene	•				ď	12												
1,1-Dichlowethane	•				ջ	12												
Elhylene Dichloride	1				ď	7												
Ethyl Bromide	•				ď	12							•					
1, 1,2-Trichloroelhane	•				G Z	12												
1,1,1-Trichloroethane	•			0.05	ď	12	0.09	0.09	1.0e-13	1.0e-13								
Perchloroethylene	•			0.03	호	12	0.12	0.12	1.7a-13	1.70-13	~							
Ethylene Dibromide	•				Ž	12												
1,2-Dichloropropans	•				g Z	18			•									
n-Propyl Bromida	8					18			•									
1-Chlorobutane	•				S.	ጄ		٠										•
n-Butyl Bromide	9				ž	24											_	•